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REMARKS

Applicants wish to thank the Examiner for the attention accorded to the instant application.

Claims 1-14 and 32 remain pending in the application. Claims 1, 2, 3 and 32 have been amended.

I. Claim Objections

The Examiner has objected to claims 2 and 3 because of informalities related to antecedent basis. Applicants have amended claims 2 and 3 to correct the informalities.

II. Claim Rejections - 35 U.S.C. § 102(b)

Claims 1-4, 7-13 and 32 have been rejected under 35 U.S.C. § 102(b) as being anticipated by United States Patent 5,942,157 to Sutherland et al. ("Sutherland I").

Applicants have amended claims 1 and 32 to more particularly point out and distinctly claim the subject matter regarded as the invention. Claim 1 now recites the additional limitation of index mismatching being a function of the degree of orientation of the liquid crystal and the degree to which liquid crystal are separated during holographic formation. The present invention, as recited in amended claim 1, is directed to a reflecting device with an electrically controllable variable reflection grating including a composition of PDLC with an index of refraction that is variable in response to an electric field. The index of refraction of the liquid crystal and the polymer matrix

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are mismatched across a continuous selection of electric field strength. The index mismatch is a function of the degree of orientation of the liquid crystal and the degree to which liquid crystal are separated during holographic formation.

Similarly, Applicants have amended claim 32 to more particularly point out and distinctly claim the subject matter regarded as the invention. Claim 32 now recites the additional limitation of a continuous selection of electric field strength across the composition. The present invention, as recited in amended claim 32, is directed to a reflecting device with an electrically controllable variable reflection grating including a composition of PDLC with an index of refraction that is variable in response to an electric field. The index of refraction of the liquid crystal and the polymer matrix are mismatched across a continuous selection of electric field strength. The index mismatch being a function of the degree of orientation of the liquid crystal and the degree to which liquid crystal are separated during holographic formation.

Sutherland I is directed to a switchable volume hologram material. With PDLC material, Sutherland I discloses that volume transmission gratings that can be made to have 100% diffraction efficiency and 0% diffraction efficiency. In other words, Sutherland I teaches an all or nothing diffraction grating. Sutherland I generally discusses index mismatching, but there is no teaching or suggestion regarding how the index mismatching is effected. There is no teaching or suggestion of a continuous selection of electric field strength or the effect the continuous electric field strength has on the peak wavelength allowed through the diffraction grating.

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To anticipate a claim under 35 U.S.C. § 102, a single source must contain all of the elements of the claim. However, in the present case, it cannot be said that the device disclosed in Sutherland I having electrically controllable, variable grating would anticipate claims 1 and 32.

Therefore, the rejection under 35 U.S.C § 102(b) should be removed and claims 1 and 32 should be allowed. Claims 2-4 and 7-13, by their dependency on claim 1, are similarly allowable.

II. Claim Rejections - 5 U.S.C. § 103

The Examiner has rejected claims 5-6 and 14 variously under Sutherland I in view of Applied Physics Letters 64 (9) (February 28, 1994) ("Sutherland II") and Sutherland I in view of U.S. Patent No. 5,644,330 to Catchpole et al. ("Catchpole").

Applicants have amended claim 1 to more particularly point out and distinctly claim the subject matter regarded as the invention. Claim 1 now recites the additional limitation of a continuous selection of electric field strength across the composition. The present invention, as recited in amended claim 1, is directed to a reflecting device with an electrically controllable variable reflection grating including a composition of PDLC with an index of refraction that is variable in response to an electric field. The index of refraction of the liquid crystal and the polymer matrix are mismatched across a continuous selection of electric field strength. The index mismatching is a function of the degree of orientation of the liquid crystal and the degree to which liquid crystal are separated during holographic formation.

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Similarly, Applicants have amended claim 32 to more particularly point out and distinctly claim the subject matter regarded as the invention. Claim 32 now recites the additional limitation of a continuous selection of electric field strength across the composition. The present invention, as recited in amended claim 32, is directed to a reflecting device with an electrically controllable variable reflection grating including a composition of PDLC with an index of refraction that is variable in response to an electric field. The index of refraction of the liquid crystal and the polymer matrix are mismatched across a continuous selection of electric field strength.

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicants' disclosure. In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

As to claims 5-6, the Examiner states that Sutherland I discloses an effective refractive index of the liquid crystal and a refractive index for the polymer. However, the Examiner asserts that Sutherland I, does not explicitly state that the liquid crystal has an ordinary and an extraordinary refractive index. However the Examiner asserts that Sutherland II, on the other hand, in disclosing electrically switchable volume gratings in

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polymer-dispersed liquid crystals, discloses that the liquid crystal having and ordinary and an extraordinary index of refraction and the refractive index of the polymer. Therefore, the Examiner asserts that it would have been obvious to one having ordinary skill in the art at the time the invention was made to adapt the specific indices of refraction for the liquid crystal and the polymer satisfying the indicated relationships to achieve devices with high diffraction efficiencies, as well as narrow band wavelength and angle selectivity.

As to claim 14 the Examiner states that Sutherland I discloses that the electrode comprises a conductive layer made out of ITO. The Examiner states that Sutherland I, however, does not disclose that the electrode is a metallic electrode. Catchpole, in disclosing a driving method for polymer stabilized liquid crystal displays, discloses that the electrode layer may be a thin layer of metal such as silver, cooper, titanium and molybdenum, including a thin layer of transparent conductive material such as Indium tin oxide. Therefore, the Examiner concludes that it would have been obvious to one having ordinary skill in the art at the time the invention was made to adapt the thin layer of metal in place of Indium Tin Oxide, as long as the metal layer is transparent for low energy consumption devices and for effective addressing of large, color displays.

Applicant respectfully submits that claims 5-6 and 14 are allowable over the various references cited in view of Sutherland I. Claims 5-6 and 14 all depend from independent claim 1 of the present invention, which includes the limitation of the index of refraction of the liquid crystal and the polymer matrix are mismatched across a continuous selection of electric field strength.

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As aforementioned Sutherland I does not discloses the limitation of the mismatched index of refraction across a continuous selection of electric field strength. Sutherland I generally discusses index mismatching, but there is no teaching or suggestion regarding how the index mismatching is effected. There is no teaching or suggestion of a continuous selection of electric field strength or the effect the continuous electric field strength has on the peak wavelength allowed through the diffraction grating. Since Sutherland I clearly teaches away from the concept of index of refraction mismatching across a continuous selection of electric field strength, any combination of Sutherland I with any of the cited references would be impermissible. A person of ordinary skill in the art at the time the invention was made, would not have had the motivation or suggestion to combine Sutherland I with any of the other recited references to feature all of the limitations of the present invention.

Based on the forgoing and since Sutherland I does not teach or suggest all the claim limitations, either alone or in combination with other references, a prima facie case of obviousness has not been set forth. Applicant, therefore, respectfully submit that claims 1 and 32 are allowable over the cited references. Claims 5-6 and 14, by their dependency on claim 1 are similarly allowable.

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III. Conclusion

For the forgoing reasons, Applicants respectfully submit that claims 1-14 and 32 are now in condition for allowance. Early notice to that effect is earnestly solicited.

Respectfully submitted,

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